1986

Implementation considerations of the Bases and Stations Information System (BASIC)--for Naval Shore activities.

Stampler, Glenn L.

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

IMPLEMENTATION CONSIDERATIONS OF THE BASES AND STATIONS INFORMATION SYSTEM (BASIS) FOR NAVAL SHORE ACTIVITIES

by

Glenn L. Stampler

March 1986

Thesis Advisor: C. R. Jones

ITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

PORT SECURITY CLASSIFICATION JNCLASSIFIED	1b. RESTRICTIVE MARKINGS
CURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
ECLASSIFICATION / DOWNGRADING SCHEDULE	
RFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
AME OF PERFORMING ORGANIZATION Naval Postgraduate School 6b OFFICE SYMBOL (If applicable) Code 54	7a. NAME OF MONITORING ORGANIZATION Naval Postgraduate School
DDRESS (City, State, and ZIP Code) Monterey, California 93943-5000	7b. ADDRESS (City, State, and ZIP Code) Monterey, California 93943-5000
AME OF FUNDING / SPONSORING RGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
DDRESS (City, State, and ZIP Code)	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

TLE (Include Security Classification)
IMPLEMENTATION CONSIDERATIONS OF THE BASES AND STATIONS INFORMATION SYSTEM (BASIS) FOR NAVAL SHORE ACTIVITIES

ERSONAL AUTHOR(S)
Stampler, Glenn L.

TYPE OF REPORT	13b TIME COVERED	14 DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
ster's Thesis	FROM _____ TO _____	1986 March	70

UPPLEMENTARY NOTATION

COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Information, Information Management, Information Resource Management, Implementation of Automated Information Systems, BASIS Project

BSTRACT (Continue on reverse if necessary and identify by block number)

This thesis provides a strategy for use by a Commanding Officer to lan and implement the Bases and Stations Information System (BASIS) at a aval Shore activity. Specific areas discussed include; an overview of hy proper information management is essential for a command, the back- round of why BASIS was developed, a discussion of problem areas encoun- ered by the staff at Mather Air Force Base while implementing a system imilar to BASIS, and implementation considerations for a command. esearch for this thesis included current readings in the area of design nd implementation of automated information systems along with interviews f several ADP Managers and Commanding Officers from San Diego area ommands. A result of these interviews was direct insight of the needs nd requirements perceived by the local commands to properly implement ASIS.

DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
NAME OF RESPONSIBLE INDIVIDUAL Carl R. Jones	22b. TELEPHONE (Include Area Code) 408-646-2767 22c. OFFICE SYMBOL Code 54 Js

FORM 1473, 84 MAR 83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

Approved for public release; distribution unlimited.

Implementation Considerations of the Bases and Stations Information System (BASIS) for Naval Shore Activities

by

Glenn L. Stampler
Lieutenant, United States Navy
B.A., Rutgers College, 1977

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

for the

NAVAL POSTGRADUATE SCHOOL
March 1986

ABSTRACT

This thesis provides a strategy for use by a Commanding Officer to plan and implement the Bases and Stations Information Systems (BASIS) at a Naval Shore activity. Specific areas discussed include: an overview of why proper information management is essential for a command, the background of why BASIS was developed, a discussion of problem areas encountered by the staff at Mather Air Force Base while implementing a system similar to BASIS, and implementation considerations for a command. Research for this thesis included current readings in the area of design and implementation of automated information systems along with interviews of several ADP Managers and Commanding Officers from San Diego area commands. A result of these interviews was direct insight of the needs and requirements perceived by the local commands to properly implement BASIS.

TABLE OF CONTENTS

I. INTRODUCTION

> We are at the dawn of the era of the smart-machine, an "information" age that will change forever the way entire nations work, play, travel, and even think. Just as the industrial revolution dramatically expanded the strength of man's muscles and the reach of his hands, so the smart-machine revolution will magnify the power of his brain. But unlike the industrial revolution, which depended on finite resources such as iron and oil, the new information age will be fired by a seemingly unlimited resource--the inexhaustible supply of knowledge itself. [Ref. 1: p. 5]

It is becoming a more and more accepted theorem that in order for individuals, organizations, and nations to compete and succeed in today's technologically advanced world, information must be treated as a valuable economic resource.

In the past, the resources of an organization were only thought to be made up of two elements: labor and capital. Today, economists, executives and managers are realizing there is a new resource that must be properly managed: INFORMATION. As President Carter stated in 1979,

> Information, like the air we breathe, is a national resource. Accurate and useful information is as necessary as oxygen to our health and happiness as individuals and as a nation. More than half of our gross national product now comes from activity related to information. Information is rapidly replacing manufactured goods as a major commodity in our economy. [Ref. 2: p. 73]

This difference in focus is significant because it emphasizes the quality and the output of computers rather than the quantity, "by the pound" approach of the past.

The data processing industry has demonstrated its capacity to produce huge outputs of paper--literally billions of pages every day. What is needed, however, is not more paper or raw data, but distilled, summarized information that can be accessed, assimilated, and used more effectively, particularly by managers. [Ref. 3: p. 3]

In the Age of Information, productivity attains a new dimension--the production of knowledge as well as goods and services. As Peter F. Drucker has written, "There are factors of substantial, if not decisive, impact on productivity that never become visible cost figures. First there is knowledge--man's most productive resource if properly applied, and totally unproductive, if misapplied." [Ref. 4]

The term productivity has a bad reputation, particularly among non-management personnel. Many workers equate the word with speed, and think that increasing productivity entails working faster and harder for the same renumeration. Such is not the case. Productivity is more than production output over labor input. The inputs of information, equipment, energy, and materials must also be included. The effective manager will be able to increase productivity of an organization, not by working harder and longer, but by working smarter and more efficiently--by knowing where information is, how to get at it promptly, and how to put it to work most effectively. [Ref. 2: p. 22]

This new concept of affording information the managerial attention usually reserved for other resources must now be

accepted by today's Commanding Officers. In order to make effective, timely decisions, a Commanding Officer must be given access to up-to-the-minute, pertinent information. According to information gathered in interviews with Commanding Officers, today's commanders feel they are to often saturated by incredible amounts of data which in many instances is disorganized and irrelevant to the problem at hand.

The need for proper information management is now more important than ever before. Ever increasing demands are being placed on a Commanding Officer's time and resources and he can least afford to waste effort in deciding what information is relevant. Accurate information must be provided to answer the following questions:

1. What are the alternative courses of action?
2. What is the cost of each alternative?
3. Are there any risks?
4. Is there a specific time frame involved?
5. Who will be affected by the decision?

Thus, proper information is the essential key to a Commanding Officer's decision making process.

A. ORGANIZATION OF THESIS

This thesis will examine several areas that are concerned directly with the implementation of the BASIS project. It will raise questions that should be addressed when a command begins planning to automate the 16 functional areas that are incorporated in BASIS.

Chapter II will provide an overview to the entire BASIS project including how it will solve the problem of managing information as a resource. It will describe the 16 functional areas selected to be automated along with the benefits to be gained by automation.

Chapter III describes a project similar to BASIS being developed by the Air Force. This discussion will include several problem areas the Air Force faced including office/building selection, construction, personnel selection, training and administration.

Chapter IV deals specifically with implementation issues. Areas that will be discussed include requirements analysis, project team members selection including the project manager, planning, hardware requirements for each functional area, and will offer several possible training plans.

Chapter V will offer some conclusions to the implementation process including a section dealing with possible resistance to automation and how this resistance can be combated.

The framework that was used to guide this research was two-fold. Initially, research into the wealth of recently written material concerning all aspects of automating an organization and information management was conducted. Readings included such areas as the treatment of information as a resource, managing this new resource, management's responsibilities, implementing automation, benefits of proper training and the phenomena of change.

After this background work was completed, "on-site" research was initiated. First, a trip to Mather Air Force Base to analyze their automated Information Management program. After observing first-hand an on-line system, discussions with Mather's project staff were held concerning problems they encountered and the solutions that might be applicable to Naval Shore commands.

The final phase of research was conducted through a series of interviews with several of the BASIS "key players" in the San Diego area. These included NARDAC personnel. ADP Managers at Naval Station San Diego, and NAS Miramar, and finally with the Commanding Officers of Miramar and the Naval Amphibious Base Coronado.

During these discussions, the primary areas of interest concerned problems these people foresee with implementing BASIS at their particular commands. The ADP people were worried primarily about performance and technical support. The Commanding Officer's concerns were in the areas of money, training, and user acceptance.

Using this background as framework of reference, this thesis was formulated as an aid to the BASIS implementation process. There currently is not an Implementation Strategy available for a BASIS Commanding Officer to reference. This thesis raises key issues which should be used as a guide by Commanding Officers prior to and during BASIS implementation.

II. BASIS OVERVIEW

In March 1984, the Chief of Naval Operations (OP-094) established the Bases and Stations Information Systems Architecture (BASIS). Through extensive requirements analysis studies conducted by several Naval Regional Data Automation Commands (NARDAC'S), the BASIS project confirmed that automated information support currently given to the Commanding Officers of Naval shore activities is woefully inadequate in meeting today's management needs.

BASIS is a mechanism for providing automated support to Commanding Officers in performing landlord functions common to most shore bases and stations. It is currently being designed as a standardized system to provide automated data processing resources to furnish local Commanding Officers with management information in a timely accurate manner. BASIS will provide:

1. One time recording and entry of data items into a central electronic data base at each naval station.
2. Future interfaces with standard Navy automated information systems.
3. A system that is easily used and understood by non-adp personnel.
4. Improved control and timeliness of reports.
5. Flexible software programs that allow specialized reports or data displays.
6. Data processing equipment (hardware) and software that ensures minimum downtime.

The BASIS program will encompass 108 Naval activities and address 16 functional areas. These areas are:

1. Staff Civil Engineering/Public Works
2. Supply
3. Comptroller
4. Security
5. Billeting
6. Administration
7. Safety
8. Aircraft Intermediate Maintenance Department
9. Clubs and Messes
10. Special Services
11. Civilian Personnel
12. Air Operations
13. Port Services
14. Transient Personnel
15. Brig
16. Staff/Support

A. BASIS BENEFITS

The following are several of the possible benefits that can be achieved from BASIS as discussed in the September 1985 BASIS Newsletter.

1. Reduce the Proliferation of Non-Standard Systems: Many locally developed systems are doing an excellent job assisting commands. Unfortunately, many of these are supported by hardware owned by individuals, or were built by exceptionally knowledgeable people who are essential to keeping the system running. Most are poorly documented and often fail when the developer

is rotated to another command. BASIS will provide standard systems that have headquarter's support.

2. Reduce the Proliferation of Incompatible Hardware: Systems that are built piece-meal, often were bought on a salesman's recommendation. Many of these companies are no longer in business. Many different types of hardware make electronically connecting this equipment almost impossible. A system based on clearly defined requirements that account for long range considerations, providing for interconnectivity and growth of compatible equipment is much more desirable.

3. Reduce the Proliferation of Different Workstations: All existing and proposed systems have their own unique terminal requirements. Offices that need to access more than one system need to have different terminals, thereby competing for valuable desk space. A single workstation that can be switched between systems is a high priority BASIS goal.

4. Reduce Duplicate Data Bases: Often, the same information is kept in multiple locations at a base. The way it is kept results in discrepancies in the information. Many manhours are spent resolving conflicts that would not exist with a carefully controlled central data base.

5. Provide Standard Systems: The cost of training and retraining personnel as they move from base to base can be considerably reduced if the system in effect at the new base is the same as the old base. Furthermore, the software need only to be developed only once.

6. More Efficient Use of People: It is estimated that 70% of the people at Naval stations do nothing but process information. Most of this is done manually. Any automation of these manual functions should result in more efficient use of people.

7. Allow Data to be Shared Across Functional Lines: Some information generated at bases and stations is used by many people. Allowing those people who need the data the appropriate access can result in better decision making, more timely decisions, and allow data to be integrated and presented in a more useful way.

8. Ad Hoc Query Capability: Use of state-of-the-art languages gives end users the capability to generate their own reports based on emergent needs.

9. Network Spinoffs:
Providing a connectivity in BASIS via local area network also provides other standard systems the capability to connect their hardware, and also provides the local CO the connectivity for his personnel office automation system.

10. CO and Department Head Management Data - Real Time:
Many current information systems produce reports weeks and months after data was gathered. Managing from a historical perspective, this often results in tracking down problems that have already been solved, and focuses attention on the past, vice on the future. Use of systems that allows managers to quickly do "what if" types of analysis results in fewer management errors.

B. BASIS PROTOTYPES

The designated organization prototypes are NAVSTA Norfolk, NAVSTA Mayport, NAVSTA San Diego, and Naval Air Station (NAS) Miramar. These Naval Stations will help define user requirements, review software requirements and definitions and certify the adequacy of the information system during the prototype phase.

There will be a threefold approach to the prototype evaluation period. The first approach will be the use of mini-computers with BASIS developed software at NAVSTA Norfolk and NAS Miramar. The second approach will be a microcomputer alternative, again consisting of BASIS software running on networked microcomputers at NAVSTA Mayport. The third approach will be a vendor alternative consisting of vendor supplied commercially available hardware and software to automate the defined functional areas at NAVSTA San Diego.

C. SUMMARY

There is every indication that BASIS will be fully capable of providing all services as promised. The proper resources have been made available to thoroughly research and design the needed system.

Through the conducted requirements analysis studies, the resulting developed BASIS applications programs now have the capability to satisfy the information management requirements for Naval Stations in the future. It provides a Commanding Officer with the proper tools to either automate previously manually performed functional areas or to network an existing computer system.

III. POTENTIAL PROBLEM AREAS

A. INTRODUCTION

In December 1982, Mather Air Force Base established the Workplace Automation Steering Committee (WASC) to oversee the acquisition of new microcomputers and control the use of micros already in use on the base. From the beginning, the overall plan of action was to take advantage of commercially available technology. As a result, in May 1984, Mather AFB, Sacramento, California was selected as the first Air Force Advanced Concepts Base. The intent of this designation was to test new ideas in office information technologies that could be of benefit to the Air Force as a whole. Ideas that did indeed prove to offer significant pay back in the form of either manpower, funds, or efficiencies were to be identified for possible promulgation Air Force wide.

B. GOALS

As stated in the Advanced Concepts Master Plan, an integrated base-wide local area network (LAN) was installed at Mather in order to evaluate various office technologies. The goals of this local network are as follows:

1. Provide a high speed medium of communication between computers.
2. Create a distributed data base environment to the maximum extent possible. Design should be horizontal between users in different offices and not vertical between subordinate and superior.

3. Define shared data by grouping functional agencies into "families" which cooperate in accomplishing missions (such as launching airplanes--Maintenance, Operations, Base Operations, Fuels, etc.)

4. Use standard data elements and codes so that codes in one organization can be directly linked to another.

5. Use commercial computer programs that are in widespread use which link data from one type of computer or software to another.

6. Control access and security.

7. Provide guidance and training for users.

8. Link all aspects of automation together such as word processors, microprocessors, minicomputers, and mainframes.

9. Insure that all programs work and are cost justified.

C. PROJECT OVERVIEW

Initially, two majors were dedicated to get this project off the ground. About three (3) months of the early stages of the project was spent researching Local Area Network technology and what was available in the marketplace. The next three were spent planning what buildings were to be on the network and how many office connection points would be in each. Three (3) months were then spent on the design and its associated solicitation, twelve (12) months on the cable installation and associated solicitation, and eight (8) months on the electronics solicitation. During this period of time the Advanced Concepts project team had grown to a total of 9 team members (1 lieutenant colonel, 5 majors, 1 captain, 1 master sergeant and a full-time secretary) not including training and support personnel.

D. PROBLEM AREAS

Every type of organization whether military or civilian will face similar problems during the planning and implementation of an automated system. Whether it be an Air Force Base, Naval Station or a multi-national corporation, problems such as physical construction, office design, training and administration will need to be addressed.

Because of this common thread, during a tour of the Mather system, special attention was paid towards any type of problem which might be applicable to a Naval Station implementing BASIS.

Through personal interviews with members of the Mather Advanced Concepts team and using information provided by the Mather Advanced Concepts Base Local Area Network Interim Report of 15 April 1985, the following are descriptions of problems and pitfalls confronted by the Mather staff while planning and implementing their system.

1. Office/Building Selection

a. Problem: Which Offices to Include in the Network?

The first decision was which offices were to be included in the network. This decision inevitably becomes which building will be included. Of the 150 buildings at Mather, 49 were selected to be put on the network initially. The decision criteria as to which buildings was as follows: If an office exchanged large amounts of information with another office, it would be included on the network. It was

decided by the Advanced Concepts team, the network should not accommodate information or data that is typically transmitted over the phone.

b. Problem: Which Buildings Get Communications Trunks Installed?

When designing a basewide network, it is strongly recommended that the communications network be designed to every building on base and included in the plans for every future building that will be built. The thinking behind this strategy might result in many buildings never getting wired, but it takes into account that over time, many of the older buildings will be eventually torn down and would be replaced with buildings that would access the LAN. It is also recommended that trunk expansion points be left in open areas of the base (even if there are not presently any buildings planned for those areas) to accommodate future buildings that might eventually be constructed in those areas.

2. Power Supply

a. Problem: How to Plan LAN Connection Points?

When the buildings and the offices that will be served by the LAN have been identified, plan to place the LAN connection points as you would common electrical outlets, with an eye to the future. Ensure that enough offices receive the connection points even though they do not presently have computers because some day connection to the LAN from these offices might be necessary.

b. Problem: Where to Locate the Connection Points?

Plan to have the connection points in close proximity to electrical outlets. Most cable plants will receive their electrical power from the coaxial cable, but the Network Interface Units (NIUs) will need power from an outlet. The NIU is the device that collectively controls access to and communications across, the local network.

3. Accurate Plans

a. Problem: Out of Date Blueprints

Ensure the base blueprints are up to date. If they are not, time and money will be wasted when installation occurs. It was discovered at Mather that the prints given to the designer from the Civil Engineering office "left a lot to be desired".

b. Problem: Inaccurate Blueprints

When the design team initiated the base survey, a distance wheel to gauge distances was not used. They assumed the blueprints supplied were accurate. It was eventually discovered many of the prints were not even to scale. At one point some measurements were off by as much as 300 feet. This is a significant distance when designing a local network. Even if the prints are advertised as being to scale, the use of some measuring device is recommended as a backup.

4. Vendor Selection

a. Problem: How to Select a Vendor?

The Mather LAN was designed by Sytek, Inc. of Mountain View, California. Sytek was awarded the design

contract based upon competitive bid. They have installed literally hundreds of single cable, coaxial networks throughout the country. Unfortunately for Mather, the standards set by the Air Force Communications Command (AFCC) after the contract was awarded, required a dual cable system. This was Sytek's first dual cable design. It is strongly recommended that once the competitive bidding process is initiated, that a vendor is selected who has a broad range of experience in all aspects of the needed technology.

b. Problem: Vendor Selection

It was planned from the beginning to do a three-phase acquisition: cable design, cable installation, and cable electronics. It was calculated and advised by many (including vendors) that the most economic approach for the Air Force would be to forego a "turnkey" solicitation and break the solicitation up into phases. This way, the Government would spend a small amount up front (in Mather's case, $17,000 for the design) to try to eliminate all of the unknowns from the cable plant installation. The designer (Sytek) estimated the LAN desired would cost $450,000. The low bidder came in at $225,000. The office felt that $300,000 was a more realistic cost. In fact, three out of seven bidders were in the $320,000 range, two were in the $225,000 range and two were in the $500,000 range. For reference, these estimates were for wiring of 120,000 feet of coaxial cable in and between the 49 buildings and 535 office connection points.

5. Communication

a. Problem: Spreading the Word

Ensure that all necessary personnel throughout the base are informed of the cable installation and schedule. Few problems were encountered while laying the cable except for cut cables during trenching or minor damage to existing communications cable in manholes. But at one point, the contractor did trench through a road without previously notifying the Security Police, Fire Department, and Civil Engineers. Keeping all concerned informed of the construction schedule throughout the project will reduce any unnecessary aggravation.

b. Problem: Proper Delivery of Hardware

It was discovered early in the project, the necessity of having the contractor ship all of the parts and materials directly to the Project Office building rather than to the staging areas. No matter what level of coordination was tried, the delivery trucks invariably received the wrong directions from the gate guards. Mather has four different gates and on several occasions the trucks would arrive at the wrong gate or received directions from a guard who just relieved the previous watch and did not know where the trucks were supposed to be directed. In many instances, the staging areas were changing almost daily. By having the contractor ship all parts to a central location, word can be passed by all concerned where to direct the deliveries. Once the trucks

arrive at the Project Office, someone who is knowledgeable of where the specific staging area is located can then direct the truck.

c. Problem: Maintaining Communication Throughout the Life of the Project

Even though all of the office connection points were determined well in advance prior to cable installation, there was still confusion when the first connection point was installed. It was a period of 10 months since the location of the connections were originally determined and, during that time, offices had been rearranged, people who were familiar with the project had come and gone and there were people now in the offices who informed the contractor that connections were no longer wanted. Because of this bit of confusion, the Advanced Concepts Team was required to develop a procedure to reconfirm every connection point prior to installation.

6. Personnel and Training

a. Problem: Appointing Proper Personnel

Designate a LAN Manager very early on in the project. At least six months to a year prior to base implementation, an officer who will be the "project" manager should be named. Preferably the rank of O-4 or O-5, (for greater ease of communication with base department heads) they will be responsible for all coordination, installation and training concerned with the project. If the Commanding Officer designates someone very early on, they have a point of contact who is thoroughly familiar with all aspects of the project

such as hardware delivery, specific needs for their base, knowledge of any planned future growth and most importantly, a sense of project continuity.

b. Problem: Personnel Training

In the area of personnel training, a civilian who is thoroughly experienced in teaching basic introductory computer topics was hired. The training itself took place in a laboratory environment on the actual hardware that would be used in the workplace. Every effort should be made to train personnel on the exact equipment, not similar equipment, so the worker will know exactly what he/she will be dealing with in the work environment.

c. Problem: Formulating a Training Strategy

Incorporate the training from the laboratory with the person's actual workplace. For example, the initial training program was a combination of ten hours classroom and laboratory work. This phase was given on Monday, Wednesday and Friday mornings. On the off days the students were given homework assignments that were taken directly from their individual workplaces. They were given very specific problems to solve in which they would likely be dealing with on a daily basis. The students were expected to bring these assignments to the "lab" where any problems were then discussed and solutions worked out.

d. Problem: When to Train?

Training should only be initiated approximately 2-3 weeks before the LAN is fully operational in the person's

workplace. Further delay between training and the ability for the person to use the system would result in the student forgetting a majority of what was taught.

e. Problem: Maintaining a Training Program

The laboratory and scheduling of training should be an ongoing process. After the initial "core" personnel are trained, a regularly scheduled class can be established and promulgated throughout the base. Supervisors can then send personnel as needed. The Advanced Concepts Team estimates approximately a 20% personnel turnover basewide. The need is therefore present to keep a formal training program operational.

E. CONCLUSIONS

All of these problems encountered by the Air Force are generic in nature inasmuch as they can surface in any organization that is planning to implement a local information system. With 108 diverse Naval commands scheduled to receive BASIS technology, some or all of these same problems could be faced by the Commanding Officers.

With today's explosion of relatively low cost computer technology, and the availability of off-the-shelf applications programs, there has been an abundance of written text concerning problems to be avoided during implementation of automated systems. Much of this literature describes in general terms many of the problems faced by Mather. It supports many of the solutions developed by the staff specifically in the areas of system requirements and personnel training.

Identifying as many potential problem areas as possibly prior to implementing BASIS, will ease much of the "crisis" management that might surface. Naval commands should use the Air Force experiences as a guide when planning each step of their individual implementation process. Not all pitfalls might have been identified, but many of the problems faced by the staff at Mather, will also be faced by BASIS commands. The ability of the personnel who are assigned to plan and implement BASIS to foresee any possible problem will be greatly beneficial.

IV. IMPLEMENTATION CONSIDERATIONS

A. INTRODUCTION

Since the BASIS applications software modules for use by Commanding Officers will be available in the very near future, it is not premature to begin consideration of an implementation strategy.

As stated earlier, the mission of BASIS (Bases and Stations Information Systems) is to provide accurate and timely information to the various management levels of naval organizations. Data processing applications must promote efficiency and be consistent with the organization's mission. The objective of the project is to provide systems that afford management control, optimize productivity and minimize operating costs [Ref. 6].

Certain guidelines also need to be developed prior to implementing BASIS at your command. These guidelines are essential for today's managers to function effectively in today's information-oriented world. The following are several considerations developed from current Information Systems philosophy concerning the proper use of information in an organization.

1. Utilization of Information:
   Information must be put to work. The acquisition, processing, and distribution of information are wasted efforts if the information is not used to its best advantage. The effective manager must initiate suggestions and stimulate ideas about how to use the information. He or she must create an information supportive climate to allow workers to use the information in innovative ways.

2. Access to Information:
The manager must encourage access to information in the command. Minimize the efforts of the workers in obtaining the appropriate information. This will reinforce the idea of information as a resource. For information management to succeed at an organization, the user must be given the proper training and indoctrination of BASIS to be able to distinguish between "nice" to know and "need" to know information.

3. Anticipation Information Needs:
Today's naval manager must anticipate information needs and not just react to information requests. This form of contingency planning in information management will be vital where time is of the essence when making strategic decisions. Anticipating information needs goes beyond acquiring the information itself. It extends to the awareness of information sources that can be quickly tapped when the information is needed.

4. Information Format:
Information must be presented in the format that best meets the needs of the user, not the format that is most convenient for the producer or most easily fits the particularities of a specific piece of hardware. Senior officers need the broad coverage that results from analysis, synthesis, and evaluation. Middle and junior level officers need the proper information that will allow them to accomplish the mission of the command, such as budget and manpower figures. Supervisors and users need information to help them fulfill their operational responsibilities which would include data concerning spare parts availability.

5. Accepting Information:
Managers must accept an open-minded attitude toward new information, even when the information may contradict prior decisions, opinions and beliefs. To get the facts is one thing. But today's manager must be able to use those facts in planning, organizing, directing, coordinating, and controlling operations.

6. Information Flow:
Information, like air, must flow upward, downward, and across ALL levels of management. The classic pyramidal chain of command organizational chart where information slowly filters downward through a series of management levels must be redefined when dealing with IRM. Today, all members of the command must be aware of what is going on and how they can contribute to the completion of the mission.

7. Information and Productivity:
Productivity improvement is based on working smarter--not harder. This is the bottom line for the entire BASIS program. This calls for well informed personnel who can incorporate new ideas to increase output by lowering labor and capital expenses.

8. Information as an Agent of Change:
Current and future actions are usually constrained by past decisions. New information can provide a larger repertoire of choices for managers as well as support for changes that negate or alter past decisions. Plans and programs must be based on how things are, not on how they were when the projected plans were initiated. Information is a force for change as well as a reinforcer of good decisions.

B. PLANNING

Before the implementation outline is discussed in detail, a few words should be mentioned concerning the process of planning. Overplanning a project such as BASIS can destroy the timeliness of its installation of the system, and will add little to the chances for ultimate success.

Underplanning can be best described by the following comment: "If you don't know where you're going, its exceedingly difficult to get there and nearly as difficult to determine that where you are is where you want to be". The major cause of large project failure (i.e., grossly inaccurate cost or schedule estimates, significant problems during implementation, or poor compliance with desired function or performance) is underplanning. [Ref. 8]

Before planning can occur, the command must make a serious commitment to plan. If the act of planning is not viewed as a priority, then it will not be accomplished. Proper planning is extremely important for the following reasons:

Planning is the key to success. To paraphrase Arnold Glasgow, "Management without planning is like shooting without aiming". Planning is the only way to manage change effectively. If the IM (Information Management) function is truly to be an agent of change, then it must plan for change.

Planning leads to better resource management. If resources were not scarce, then perhaps there would be no need to plan. Because computer and human resources are not unlimited, they must be allocated to the right priorities, to doing those things that will bring the greatest benefit to the company. Priority setting requires planning.

Planning improves communications. A survey by McLean and Soden that the two primary long-range objectives of the information managers surveyed were (1) to improve user communications and cooperation and (2) to improve top management communications and support. Planning helps to close the communication gap with users and top management.

Planning brings control. Management by objectives beats management by crisis. Control beats chaos. Planning helps to bring about control, control buys time in which to plan, and planning leads to more control . . . . a nice fire-prevention cycle.

Planning influences the future. You must invent the future, not just let it happen; shape it, don't wait for it. Long development and lead times in the IM world dictate the need for long-range planning. Long-range planning, in turn, improves short-term decisions and starts the action of molding the future toward the achievement of objectives. [Ref. 3: pp. 36-37]

Each Naval Station obviously has its own specific needs and desires. Table I, entitled Implementation Outline, gives a brief overview of the topics discussed in detail throughout this chapter. These four specific topics--Project Manager, Requirements Analysis, Training, and Administration--were topics specifically raised by Commanding Officers and ADP Administrators. These are the areas

TABLE I

IMPLEMENTATION OUTLINE

A. Project Manager

Duties, responsibilities and technical expertise needed by the person to properly manage the implementation of the BASIS project for their command.

Also discussed is the make-up of the project team that will be needed to support the project manager during implementation.

B. Requirements Analysis

Discussion of the needs of the 108 Naval Stations in such areas as: required functional areas to be automated, hardware solutions, and local area network considerations.

C. Training

Pros and cons of various training strategies are presented along with the responsibilities of the key personnel involved.

D. Administration

Access, passwords, record keeping, adding new or deleting transferred personnel from the system are some areas discussed.

The responsibilities and duties of how to maintain a system such as BASIS once it is implemented and operational.

they feel should receive priority attention during planning and implementation.

C. PROJECT MANAGER

Someone obviously needs to be in charge of the BASIS program for each Naval Station. Each command has already designated a BASIS Point of Contact (POC) to NAVDAC, but now is the time to begin formalizing the organizational structure that will oversee the program from initial planning to implementation to maintenance. In order for the BASIS program to be implemented properly and for it to be successful in satisfying its stated mission, the following points should be stressed:

1. Because this project has been given high level attention throughout the Navy, and the great amount of resources expended to make BASIS a reality, this project should be viewed by the command as a special, unique entity that must be given a great deal of planning and management attention.

2. Because of the high level of complexity that implementation of the BASIS project will entail, coupled with the tremendous amount of attention to detail that will be needed to insure success, a BASIS Project Team must be formed. This team, under the direction of the command's Project Manager, would be responsible for planning, site preparation, requirements analysis, networking requirements, hardware and software acquisition, installation, training, and administration.

D. PROJECT MANAGER ATTRIBUTES

Generally accepted attributes for a person who is to be named as an Information Systems Project Manager are as follows:

1. Thorough knowledge of all the various functions within the Command, their inter-relationships, and the overall mission and objectives of the functional areas.

2. The Project Manager should be able to translate the organizational objectives into resource requirements and provide standards to honor them.

3. The Informations Systems Manager (ISM) should be able to plan and control the required resources to effectively manage and control an automated system.

4. It is imperative that the ISM establish visibility on all known and planned (manual and automated) systems within the organization with a look towards compatibility and future information exchange.

5. The ISM should create a committee of technical user representatives from the functional areas, to evaluate and approve usage without redundancy, using accepted project management techniques.

6. The area under the ISM's cognizance should be staffed with result and people-oriented personnel that are keenly in tune with the command's goals and objectives. [Ref. 9]

In addition to the above qualities, several Naval Station ADP Managers also feel the following points need to be considered:

1. NOT be the command's ADP/Data Processing Manager. In order to be able to dedicate the required amount of time, and properly supervise and implement BASIS, a separate Project Manager must be designated. A command's current ADP Manager will not have the necessary available time along with their other responsibilities to give BASIS the effort needed. The BASIS Project Manager needs, of course, to work closely with the command's ADP Manager, especially for technical advice, but a separate person will allow the management of implementation to be a far more controllable evolution.

2. The person who is eventually appointed as the command's BASIS Project Manager needs to be designated as far in advance as possible. Depending on the size of the particular base, and the option chosen as how to automate (micro vs mini vs vendor), a Project Manager might need to be selected as far as 6-12 months in

advance. This would be especially true in the case of large Naval Stations where there already exists automated systems in operation and a local network might need to be designed. Such problem areas as site preparation, telecommunications requirements, hardware compatibility, training, and funding requirements all have long lead times to accomplish what is needed and all must be addressed early in the life of the system.

3. If the manning requirements allow, it is recommended that the BASIS Project Manager be military and not a civilian. It is also recommended that this person be of a rank equivalent to that of the other department heads throughout the base. This type of designation has several advantages.

    a. The person will already have thorough knowledge of the entire organization. This is an invaluable asset, especially when the hardware requirements analysis is to be conducted or understanding the specific needs of the user departments.

    b. Being military, and the same rank as the other department heads, communication and problem solving should become easier. It will be a peer-to-peer relationship and this will be important, especially when dealing across the various departments of the 16 functional areas.

    c. The job of BASIS Project Manager should be viewed as a full-time job and not as a temporary appointment. BASIS will be an ongoing concern. Maintenance of the system will continue as long as the system is being utilized. Training newly arrived personnel will never stop.

    d. In essence, the Project Manager and the Project Team should be formed into a separate and distinct department with the same chain of command reporting responsibilities as any other department head. This type of organizational structure would be especially important to any command with little or no computer systems experience.

Recognition of the need for an information manager to manage the information resources of an organization is paramount, or everyone's responsibility will become no one's responsibility. The information manager must report directly to the highest level of the corporation so that he can determine firsthand what the corporation's information needs are and can also provide unfiltered information directly to top-level management. The information manager must be

> recognized as an integral part of the organization and must receive more than just a job title and an office. The highest levels of the corporation must support the information manager publicly and financially. [Ref. 2: p. 116]

E. PROJECT TEAM

Once the Project Manager has been selected and designated, he/she will need help with getting all phases of BASIS operational. Each command should establish a Project Team in order to be able to completely monitor the system from implementation to maintenance. The members of the team will consist of persons who will have the technical expertise to properly support the project manager. Based again on interviews with various ADP Managers at several Naval Stations, in addition to the project manager, ideally the team should consist of a minimum of the following personnel:

Data Base Administrator (DBA)

Local Area Network (LAN) Manager

Trouble Shooter (Assistant Project Manager)

Appendix A consists of several job descriptions held by the Office of Personnel Management which can be used as guide to possible selection criteria of the Project Team. In most cases, each Naval Station will need to write specific individual job descriptions. The job descriptions provided in Appendix A correlate duties, technical expertise, and knowledge required by OPM with GS levels.

As the overall administrator of BASIS for the command, the Project Manager will be the person answerable for the

day-to-day operation of the system, especially the handling of any daily "crisis" that might arise. Whoever is selected will be responsible for ensuring the system hardware actually arrives and is installed properly, and application software is installed and functions as specified. The "Manager" will also oversee the particular security system that is selected for the command. This will include such areas as system access, passwords, and user administration.

1. Data Base Administrator (DBA)

The position of Daba Base Administrator (DBA) has emerged in recent years due to the growth in size and complexity of data bases. The primary duties of this administrator include upkeep of data, completeness of files; data maintenance, which may entail moving data from one storage media to another for quick and efficient access; maintenance of historical data, including modification of files when definitions of data elements and classifications change; and purging of useless data. Any changes to the data base, directories, or dictionaries must also be approved and supervised by the DBA. [Ref. 10]

2. Local Area Network (LAN) Manager

The next addition to the BASIS Team should be someone thoroughly familiar with the technology of Local Area Networks (LAN). When planning a system that will include many computer terminals in various offices and buildings scattered throughout a Naval Station, input must be received by a LAN expert.

Unless a command has absolutely no future plan to have one office "talk" to another via the BASIS network (which would be a waste of resources since a primary benefit of BASIS will be the ability of departments to electronically communicate) LAN expertise will not be required. The Commanding Officer at the minimum should investigate the feasibility of networking certain "families" of the 16 functional areas.

Not only will networking of the BASIS functions need the technical advice of a LAN Manager, but there is the problem of what to do with any existing automated systems at the command. If, for example, an air station has already automated their aviation maintenance functions, who will make the determination if it's feasible to stay with the current system, switch to BASIS, or stay with the system now in use and attempt to network it to BASIS. Because of these additional concerns, someone who is thoroughly knowledgeable in telecommunications, site preparation, available hardware/software technology, and all other LAN requirements should be included as a team member.

3. Trouble Shooter

One other person should still be added to the team. This person can be called a Trouble Shooter, or Assistant to the Project Manager or whatever, but an extra person in the Project office will prove essential.

The "Trouble Shooter" would be available to work very closely with the user departments. He/she will be

another point of contact in which a user in the "field" could contact and get an immediate answer to a problem. This is an extremely important point when considering the possible success or failure of this system at your command.

It must be remembered who will be using this system. The majority of its users will be personnel who have had very little, if any, previous experience of working with a computer system. This also includes senior personnel who have never supervised an automated system. The worst feeling for a user within this environment is to feel alone, that no one is available to support them. This feeling must be avoided at all costs, else the system is doomed for failure. Having a trouble shooter available who will assist the users in their day-to-day frustrations with the system will aid in greater acceptance of BASIS. The perception by the users will be that the command is serious about making BASIS a success and is willing to dedicate the resources necessary to bring this about.

F. REQUIREMENTS ANALYSIS

Now that the Project Team has been staffed, it is now necessary to conduct an analysis of not only what the ADP needs for the command are, but how these needs can be satisfied by the BASIS functional areas applications programs. Most of the traditional requirements analysis work has been or is currently being accomplished by NARDAC's around the country. First what is needed, is for each command to conduct

a basewide survey of exactly which departments already have formal automated systems in use or at least are employing micro-computers in their offices. Many Naval Stations have purchased computer systems, especially in the areas of supply, aviation maintenance and administration. The problems concerning these existing systems are several:

1. According to research conducted by NARDAC San Diego, most of the systems that are in operation are not compatible with each other and were installed without any forethought to compatibility.

2. It is even less likely that any of the systems already in use will be compatible with BASIS.

3. If a command already has a functional area that is automated, a determination must be made if it will be beneficial for the command to abandon the existing system in favor of installing BASIS and forming a compatible network, or keep the existing systems and automate other functional areas using BASIS technology.

In other words, what the command needs to accomplish is an "Information Audit". This is a thorough examination and review of your information assets.

1. Information Audit

Essentially, the information audit is a comprehensive operational audit that seeks to answer the following types of questions:

1. Does the company have the information resources needed to achieve its organizational objectives?

2. Are the information assets accurate and current?

3. Are the information assets and information-related equipment and materials used efficiently?

4. Do the information personnel operate effectively in providing all levels of management with information in the medium and format that will offer the maximum impact for decision making?

5. Where are problem areas that, if corrected, (automated) will result in better operations? [Ref. 12]

For further discussion concerning how a Naval Station can determine its information requirements, a Naval Postgraduate School thesis entitled A Methodology for Naval Bases and Stations Requirements Analysis: The Case of NAS Moffett Field, by LCDR Stephen A. Luhrman, September 1985, should be consulted.

The information audit is not only helpful in addressing known problems dealing with information, but aids in identifying potential trouble spots that could cause serious problems in the future. The information audit can serve as an "early warning system" to identify those information resources that should be obtained now so they will be available to the organization when they are needed in the future. The bottom line of a command's requirements analysis, is to determine which of the 16 functional areas are needed to be automated and in what order of priority.

2. Hardware Requirements

Once the decisions have been made as to which functional areas will be automated, the next phase of the requirements analysis will be to determine the hardware requirements for the workcenters. Appendix B is supplied as a guide (reprinted from the BASIS Newsletter, July/August 1985) developed by NARDAC San Diego, to assist in defining your hardware needs and to list the primary functions that will be automated in each area.

The recommendations presented in Appendix B, such as the number of workstations needed for a functional area,

or the determination of a dot matrix printer vs letter quality, are the result of several requirements analysis studies conducted by various NARDACs at San Diego, Norfolk, Pearl Harbor, Jacksonville, and three by San Francisco.

G. TRAINING

Based on several interviews with Commanding Officers from various San Diego area naval stations, one of the primary topics of concern is training. There is a genuine fear that this system is not being designed to take into account who the primary users will be--a junior grade sailor with no previous experience on a computer or dealing with an automated system of any kind.

Based on personal experience working with the SNAP II system aboard ship, the author feels that training is THE key ingredient for a successful program. If the training is not focused directly on the user, beginning with the most elementary computer basics, the chances for failure are greatly increased. Personnel must not only be trained on how to sit at a keyboard and enter data, but they must be indoctrinated into the overall philosophy of BASIS and how their role is essential for the command in completing its mission.

Based on a highly successful training program developed at Mather Air Force Base the following are several considerations when forming a training program for your command:

1. It is recommended that resources be dedicated to construct a formal training lab. This would include not only a classroom setting, but a laboratory with the actual hardware/workstation configurations that the user will see and work with in the workcenter.

2. The idea of having the "student" report to a school setting away from the place of work, will increase the chances of better concentration and comprehension. The attention of the user will be focused on nothing but BASIS, and within this environment the user will feel free to ask questions and the pace of instruction can be geared to the specific students attending. According to studies at Mather Air Force Base, on-the-job training by itself would not offer the same results. There are too many distractions for a person's attention and the concentration level and desire to learn isn't as great.

3. This is not to say that on-the-job training will not have a role to play in this training program. Ideally, "OJT" should be used in conjunction with the classroom/lab environment. Using the example from Mather Air Force Base, the student reports to the lab on Monday, Wednesday, and Friday mornings for classroom instruction and practical work in the lab on the actual hardware in which they will be using.

When the student reports back to the workcenter, they will be using what they learned in the classroom and, if any questions arise about how they actually interface with this system, they can then go back to the classroom and work the problems out with the instructor.

Other training considerations include:

1. Another option towards training would be to form a Command Training Team (CTT), who would be responsible to go to the various functional areas and train the individual workcenters. This training team would be formed from volunteers of the departments/offices concerned with BASIS. This team will be trained in all aspects of BASIS software applications and its associated hardware. As functional areas are implemented with BASIS, this team will travel from workcenter to workcenter conducting the needed training. The training of the CTT itself could be conducted by a local NARDAC.

2. As mentioned, NARDAC can be employed by the command to either train the local CTT, or NARDAC personnel can be used to train the workcenters themselves in the use of BASIS. Of course, there is a charge for these services. For example, according to the training officer at NARDAC San Diego, their personnel recently developed a series of training classes for AIRPAC to learn BASIS and the cost was $4,000.00 for a five-day class with a maximum number of 20 students per class.

3. A final possible option would be for the command to hire a civilian instructor who has experience in teaching computer classes. With the recent popularity of micro/mini computing, there is an abundance of instructors available at the local junior college or university levels. Again, this person could be used to train in the laboratory, train the CTT, or the personnel directly in the workcenters. The cost of hiring a civilian instructor must be weighed against the cost of the other training options and which would be most beneficial for the command in the future.

H. ADMINISTRATION

Once BASIS is fully implemented and functioning, the primary responsibility of the Project Manager will be the day-to-day administration of the system. This will probably take the form of solving any problems that arise, answering user inquiries, monitoring system usage, any repairs to hardware that might be necessary, and supervising an ongoing training program.

Studies by Mather Air Force Base estimate a 20% user turnover of their automated system. Therefore, a command program should be developed that will address newly arriving personnel to ensure that they will be indoctrinated on the BASIS system. Ideally, the scheduling of a BASIS training session should be made a part of the check-in process. If

a person checks into a department which uses BASIS, and that person is immediately indoctrinated to the system, the transition for that person into the workcenter will be much smoother for all involved if the BASIS training is accomplished as soon as possible after arrival.

Other areas of administrating the system also coincide with basic security functions. At the minimum, each user should be given a user ID number and a password in order to access the system. This type of basic security serves two purposes:

1. Controls access to the system to only those authorized, and
2. Controls what information within the system can be accessed by which users.

It's obvious that not everyone at the command needs to know the same information. There must be control over who has access to what information is held by BASIS. The use of a system that matches the user ID to what information can be accessed, is very easy to implement and will give adequate security for the system.

I. COMBATING RESISTANCE TO CHANGE

As a Naval Station implements BASIS, and departments eventually become automated, new attitudes in the various workcenters will be formed concerning how Naval workcenters are changing. One area of concern described by both ADP Managers and Commanding Officers deals with possible resistance to automation by members of their command. This final

section of Implementation Considerations will address the subject of organizational change, some of its problems specifically concerning automation, and how a command can combat any resistance to the BASIS project.

The word "change" refers to any alteration, substitution, new development, process, or difference from the way things once were. In one sense, a change is any difference in one part of the environment that alters the total environment, whether drastically or in a very minor fashion.

When change occurs in an organization, it usually takes place at a particular department/division and with a particular group of people. Naturally the change will be most drastic at the "point of pressure", or the primary location of the change. But, any change will have repercussions throughout the organization and will affect all workers, whether or not they are directly involved. Technological change is a human problem, not just a technical one. [Ref. 12]

This will be especially true with the BASIS project. If a Naval Station implements most, if not all, of the 16 functional areas, a large percentage of the activity's work force will have to adapt to a new way of accomplishing their daily work assignments. When an organization has achieved equilibrium, the people in the various departments know what to expect of their fellow workers and the work environment itself. They become familiar with their surroundings, their relationships with others and what to expect every day they

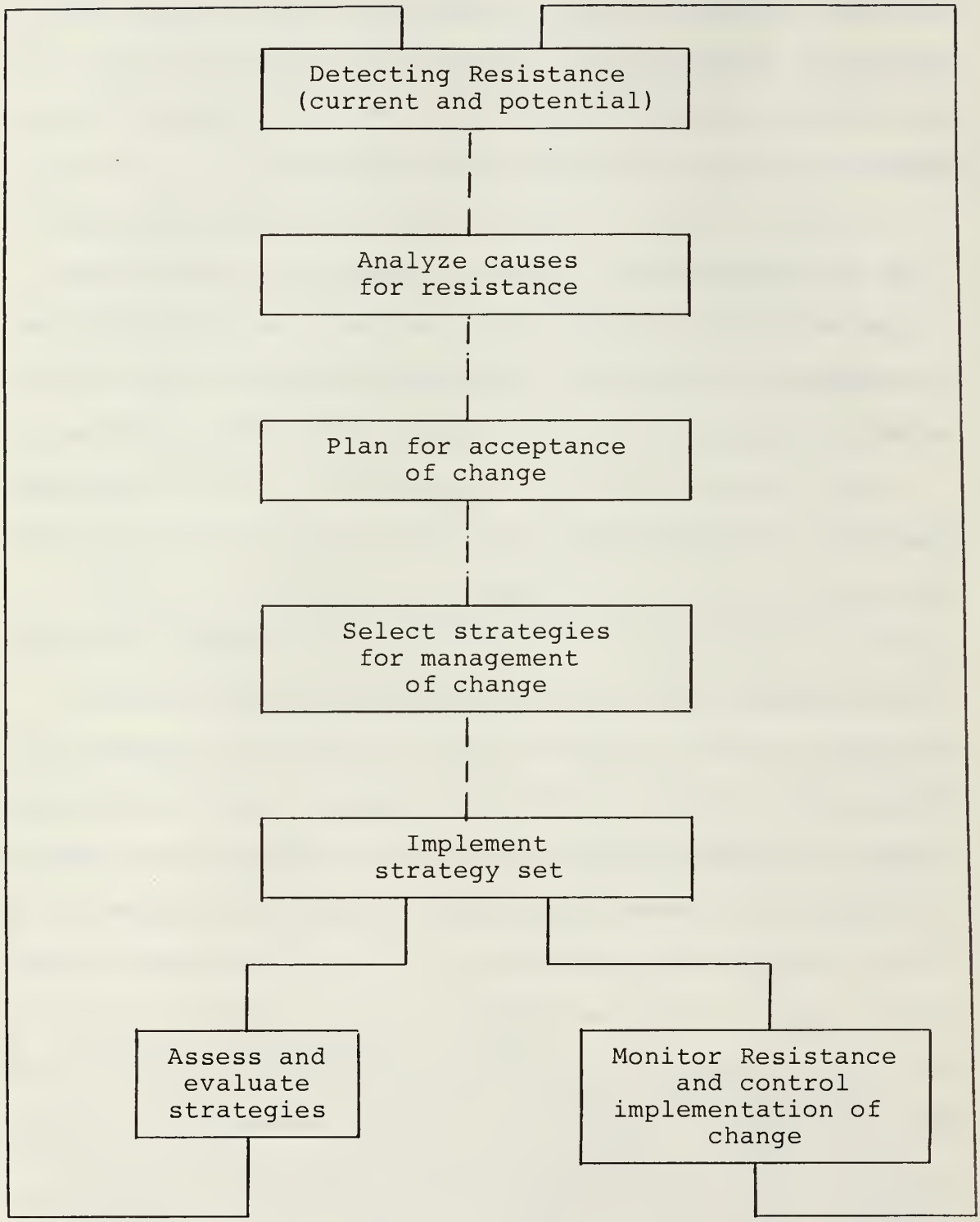

Figure 1. The Management of Change

come to work. One reason a Naval Command is considered a success, is that the environment is very stable; it's always in equilibrium. The people who work at a Naval Station are confident that the daily routine will remain constant (unless something extraordinary occurs) every day they report to work. According to readings on the subject, the concensus is that it is much easier for individuals to remain well adjusted when their environment is in equilibrium. Change requires that workers make adjustments to reach a new equilibrium.

It seems most people resist any adjustments to their environment, and this possibility of resistance must be addressed by each command as it prepares to implement BASIS. To minimize the possibility of resistance to any change, the command's responsibility in such a situation is (1) to gain acceptance for necessary changes and (2) help restore the equilibrium of both the work group and the individuals within it. Figure 1 illustrates the various stages of the management of change.

J. WHY RESISTANCE?

Resistance to change in the work environment can surface in various forms. Several of the most common reasons include the following.

1. Economic Reasons

When change threatens to disrupt the work environment so extensively that it appears that some workers are likely

to lose their jobs, economic reasons play a major role in resistance to change. In recent years, automation has eliminated some jobs. Once it seems certain that a change will cost workers their jobs, they will not be soothed by arguments that automation in their plant will help the business run more efficiently. Their only concern is their own economic well being and that of their families.

2. Inconvenience

Any change that makes life more difficult, even for a short period of time, is likely to be resisted. A worker already knows the ins and outs of his job, and a new system such as BASIS will call for new methods and new standards of performance. Learning new "ways" requires energy and concentration. It is much easier to continue old ways of doing things.

3. Uncertainty

Even when change introduces an obvious improvement, it creates uncertainty and anxiety. Many people feel threatened when former ways of doing things no longer apply. Fear could well be the major cause of hostility toward any change threatening a person's security or status.

4. Threats to Social Relationships

Status arrangements, leadership and follower positions, task specialists, and other roles within the group are settled. These relationships are understood by group members and situations can be handled according to the group's

informal roles. When change occurs in the work setting, it will often alter the patterns of personal relationships.

5. Resentment of Control

Change often means that workers will be supervised more closely for a while to insure that they are learning their new tasks and accomplishing them properly. When this happens, workers are constantly reminded that supervisors and management have greater authority, and this can increase their irritation before or during a change. Any attempt on the part of management to increase control over workers will also increase resentment. People become used to a certain amount and type of control and will fight management efforts to strengthen that control. [Ref. 12: pp. 354-356]

From a management view, one reason many managers find themselves opposed to automated information systems is that computers alter the decision making process. Decisions are no longer based on intuition but on data provided by the system supplemented by human judgement and experience. This type of decision making might require managers to develop a different type of conceptual thinking. Many managers find their formal style of decision making under attack and are unable to adjust to the new technology. [Ref. 10: p. 390]

This problem of a manager adjusting to a new technology could be a very real problem at a Naval Station. Many of the senior enlisted and officer supervisors come to a shore activity from operational billets such as ships or squadrons and their management style is based on "fleet" experience.

For these types of managers, who rely on a great deal of instinct in their decision making process, having to analyze data from a computer in order to solve a problem, could be met with resistance.

K. COMBATING RESISTANCE

> It is important, we believe, to go back and look at the present system before determining an action plan to achieve relatively explicit goals. Experience has shown that organizations and their managements often make erroneous assumptions about the current state of the organization when developing change strategies. The consequence of such a mistake is that the action plans developed assume a different current organizational condition that actually exists. The result of then implementing those action plans is likely to be confusion, frustration, unexpected resistance, and generally a failure to achieve the desired goal. [Ref. 13]

Fortunately for Naval commands, the traditional causes of resistance as previously discussed are not directly applicable. BASIS was not designed to replace workers or restructure social relationships, but supervisors must be aware that these fears exist. When combating any resistance, combating the perceptions of the workers whether right or wrong, must be addressed. For example, when employees are told their work places are being automated, the perception that often occurs is that automation equates to job losses or reorganization of traditional work habits. Studies conducted concerning the effects of possible office automation have found that the typical worker feels threatened by concepts such as "computer" or "automation" and these fears must be addressed by the command when implementing BASIS.

Tolerance to change is dependent on a number of variables. Resistance is generally proportional to the number of persons involved in the change, and also increases as the rate of change increases. Rapid change has been known to produce dysfunctional behavior such as alienation, withdrawal, apathy, and depression; but even controlled change can led to emotional stress and illness. [Ref. 12: p. 390]

Probably the most important element in combating any resistance will be a high level of communication throughout the command. In military organizations it is at times very convenient for senior personnel to order or mandate a change and feel no further explanation as to the "why's" of the change are necessary. In a far reaching system such as BASIS, where many workcenters will be permanently changed, a full series of explanations concerning the philosophy behind BASIS and the command's "feelings" towards this new system will greatly aid in making BASIS a success. Improved communication can speed acceptance of change. If rumors are allowed to run rampant, resistance will be intensified. It has been found, that when the nature, extent, and anticipated implications of change are fully stated, with any possible problem areas openly discussed, resistance will be minimized.

V. SUMMARY

The purpose of this thesis is to assist Commanding Officers and their staffs with planning for the arrival of the BASIS system at their command. Obviously, with 108 different Naval Stations receiving BASIS technology, the requirements will vary. Discussion of the many issues raised will help formulate a BASIS plan and implementation strategy.

The three primary areas of concern of this thesis--the Mather Air Force experiences, the four topics of the Implementation Outline, and the discussion of organizational change--were emphasized because these were the primary concerns of the people in the "field" who will have to implement and work every day with BASIS. The areas of Project Team Selection, Training, Administration and Acceptance are topics that hold genuine fears by ADP Managers and Commanding Officers.

The people at the local command level feel the necessary resources are being allocated to properly conduct requirements analysis, and hardware/software development, but too little attention is being paid to training and user acceptance. This thesis wanted to raise several, diverse considerations which, if addressed at the command level, would assist in properly planning for implementation.

As the BASIS technology becomes available, each Command must begin to decide the most beneficial ways to design and implement. BASIS was developed as an aid to reduce every

day problems and workload; it should not create additional problem areas. As stressed throughout this thesis, proper planning and forethought will reduce any crisis management and enable a much smoother transition towards automation.

APPENDIX A: JOB DESCRIPTIONS

The following are examples of several job descriptions currently on file with the Office of Personnel Management. These descriptions and corresponding GS levels are given as a guide to the technical expertise required of the BASIS project team.

COMPUTER EQUIPMENT ANALYST (GS 9)
(Project Manager)

DUTIES: Performs analytic and evaluative duties in connection with acquisition and utilization of ADP equipment at an installation.

-Serves as the local ADP organization's primary specialist on day-to-day equipment matters and as liaison with vendors, the installation's contracting officer, and the installation's comptroller, where computer equipment resources are concerned.

-Develops information for local input to feasibility studies being conducted by higher headquarters on possible equipment changes for proposed standard systems applications. With the assistance of systems programmers and user representatives, gathers and analyzes data concerning various subjects such as possible conflicts with existing systems and current utilization rates on various items of equipment.

-Reviews users' and ADP organization's requests for additional units or replacements. Considers utilization

rates, reviews pertinent literature and confers with user and ADP co-workers as necessary, conducts tests or evaluates equipment tests and recommends action.

-Assists in developing plans for funding of equipment projects. Drafts the installation's ADP equipment rental/maintenance budget and, in coordination with the activity's budget officer, monitors expenditures to ensure that funds are available for contractural arrangements.

-Keeps abreast of commercially available equipment of potential use to the command and advises the C.O. of those items with merit.

KNOWLEDGE REQUIRED: Knowledge of the technical characteristics of the computer equipment at the command, knowledge of established equipment testing methods and terminology, and knowledge of the local mission in order to evaluate equipment alternatives arising from shifts in workload or different brands/models of replacement equipment becoming available. Knowledge of agency ADP standards and policies and familiarity with procurement and budgeting procedures to advise the head of the installation's ADP organization on these matters as they relate to computer equipment. Knowledge of published sources of technical information on computer equipment.

COMPUTER EQUIPMENT ANALYST (GS 13)
(LAN Manager)

DUTIES: Serves as a team leader within a teleprocessing systems group which is responsible for developing and maintaining the agency's data communication utility.

-Plans and organizes teleprocessing study projects, coordinates efforts of team members and contractors in the analysis of current and future teleprocessing systems for agency components. Uses network simulation techniques to analyze operations and evaluate new designs and/or equipment changes to accommodate projected workloads. Designs enhancements to current equipment systems, new approaches, and new networks.

-Analyzes all requisitions for telecommunications front-end processors, modems, lines, terminals, and related technical equipment within the agency. Assures that proposals are consistent with the agency's long-range plans and budget constraints. Establishes guidelines, defines measurable goals, and monitors performance of vendors and contractors for conformance with contract specifications.

-Performs a variety of technical assistance duties. Serves as the principal teleprocessing representative to agency components and liaison between other ADP technical staff and user bureaus. Assist bureaus and offices in defining their teleprocessing needs. Develops

and maintains standards and procedures relating to teleprocessing matters within the agency.

KNOWLEDGE REQUIRED: Knowledge of the latest developments in computer and teleprocessing hardware, to include peripheral equipment and interrelationships between components, knowledge of pertinent software capabilities and knowledge of design techniques to lead studies for the development of advanced teleprocessing systems for the agency. Knowledge of the agency's policies and standards relating to teleprocessing, knowledge of computer equipment evaluation techniques and knowledge of the missions and functions of the major agencies within the agency (command) to serve as the agency's technical expert in advising on the merits of proposed teleprocessing matters.

COMPUTER SYSTEMS PROGRAMMER (GS 14)
(Database Manager)

DUTIES: Coordinates efforts towards achieving the departments long-range plan of phased introduction of data base management system (DBMS) technology to facilitate operation of agency-wide standard applications systems.

-Studies resulting analyses and problem definitions; considers relationships to other system software efforts planned, overall policies and DBMS plans, and makes recommendations on which areas merit full study.

-Develops overall plans, criteria and programming specifications for DBMS projects. Oversees system testing,

coordinates formal documentation preparation, effects systems release procedures, and represents the organization in matters pertaining to DBMS projects.

KNOWLEDGE REQUIRED: Knowledge of advancements in an ADP specialty area, the needs of applications programming personnel, and pertinent computer equipment characteristics of both special purpose and general purpose equipment used throughout the department, to define issues and problems, plan and conduct feasibility studies, and advise top management concerning long-range advanced software. Knowledge of the organization's basic ADP policies and standards along with the technical aspects of pertinent system software and application program interaction to develop guidelines for the use of DBMS languages and procedures.

COMPUTER ASSISTANT (GS 9)
(Assistant Project Manager)

DUTIES: Incumbent works in the data processing center as a systems monitor resolving processing problems and error conditions.

-Identifies and determines corrective action to be taken in case of individual failures not covered in the opertions manual, or in circumstances when the prescribed procedures will not produce a solution.

-Determines need to reconstruct data base from back-up files, rerun or restart requirements and need to shift run sequencing in order to better align jobs or better

apply system utility programs in relation to jobs on the schedule.

-Resolves partial system failure (hardware or software) by providing for revised applications of system operating capabilities in a manner that allows working through or around the problems with reduced capacity, readjusting the system when full operating configuration is restored.

-Ensures restoration of transactions and data bases at a proper restart point after system initialization and recovery routines have been used to resolve error conditions and the system has been reloaded for continuation of operations.

-Works with applications programmers and operations personnel to identify problems with applications, operting systems or hardware that are difficult to pinpoint.

-Plans, schedules and directs the transfer of program and/or data files from disk to tape storage, maintains records of programs and data so stored, and schedules restoration/recovery from back-up files when needed for problem solving in subsequent processing.

KNOWLEDGE REQUIRED: Detailed knowledge of system hardware and software and how they are interconnected in normal and variable operating conditions.

-Knowledge of the codes, abbreviations and terms used in the system monitoring and control utility program and in order to acquire, interpret and resolve problems

based on information derived from system monitoring reports and dumps.

APPENDIX B: HARDWARE/WORK STATION RECOMMENDATIONS

ADMINISTRATION

1 Workstation
1 Letter Quality Printer
Communications Hardware

1. Correspondence Appointment Logs & Ticklers
2. Sorting/Alphabetizing Personnel Listings & Telephone Directory
3. Forms Control
4. Military Personnel

AIR OPERATIONS

2 Workstations
2 Dot Matrix Printers
Communications Hardware

1. Air Traffic Control
2. Flight Planning
3. Cargo Control
4. Maintenance Equipment Inventory
5. Air Terminal Control

AIR INTERMEDIATE MAINTENANCE DEPARTMENT

4 Workstations
4 Dot Matrix Printers
Communications Hardware

1. Repair Component Inventory
2. Work Schedules
3. Equipment Control Inventory
4. Quality Assurance
5. Maintenance Statistical Reviews

BILLETING

<u>Unaccompanied Enlisted Personnel Housing</u>

2 Workstations
1 Dot Matrix Printer
1 Letter Quality Printer

1. Reservations/Registering
2. Reports
3. Internal Administration
4. Accounting
5. Correspondence

Unaccompanied Officer Personnel Housing

2 Workstations	1. Reservations/Registration
1 Dot Matrix Printer	2. Reports
1 Letter Quality Printer	3. Accounting
Communications Hardware	4. Correspondence

BRIG

1 Workstation	1. Prisoner Control
1 Letter Quality Printer	2. Work Schedules
Communications Hardware	3. Rosters and Listings

CIVILIAN PERSONNEL

2 Workstations	1. Personnel Wages & Classification Control
1 Letter Quality Printer	2. Labor & Employee Relations Administration
1 Dot Matrix Printer	3. Employment & Staffing Control
Communications Hardware	4. Civilian Personnel Divisions Coordination
	5. Employee and Career Development Reviews

CLUBS AND MESSES

2 Workstations	1. Accounting
1 Letter Quality Printer	2. Reports
1 Dot Matrix Printer	3. Correspondence
	4. Purchase Orders

COMPTROLLER

4 Workstations	1. Budget Reports
2 Letter Quality Printers	2. Operations Reports
2 Dot Matrix Printers	3. Memorandum Accounting Reports
Communications Hardware	4. Audit Reports
	5. Management Studies
	6. Correspondence

PORT SERVICES

2 Workstations
1 Letter Quality Printer
1 Dot Matrix Printer
Communications Hardware

1. Maintenance Schedules
2. Ship Service Schedules
3. Accounting Reports
4. Personnel Records
5. Movie Rentals Log and Inventory
6. Correspondence/Messages

SAFETY

1 Workstation
1 Letter Quality Printer
Communications Hardware

1. Appointment Log/Schedules
2. Track Budget

SECURITY

Police

1 Workstation
1 Dot Matrix Printer
Communications Hardware

1. Vehicle Decal Control
2. Traffic Violation Control
3. Report Processing

Shore Patrol

1 Workstation
1 Letter Quality Printer

1. Incident Reports
2. Violation Reports
3. Records

Security/Fire

2 Workstations
1 Letter Quality Printer
1 Dot Matrix Printer
Communications Hardware

1. Inspections/Maintenance
2. Personnel/Training Records
3. Building Records
4. Reports
5. Correspondence
6. Deficiency Logs

SPECIAL SERVICES

Admin/Finance

1 Workstation
1 Dot Matrix Printer
Communications Hardware

1. Salary/Fringe Benefits
2. Fixed Asset Acquisition Inventories & Reports
3. Income (DAR's)
4. Budget
5. Purchase Orders
6. Berthing System-Marina
7. Checks/Payments
8. Reservations/Payments

Athletic

1 Workstation
1 Dot Matrix Printer
Communications Hardware

1. Athletic Event & Facility Scheduling
2. Fee Collection/Reporting
3. Class/Team Rosters and Lists

Publicity

1 Workstation
1 Dot Matrix Printer
Communications Hardware

1. Correspondence Tickler System
2. Appointment Log

Library

1 Workstation
1 Dot Matrix Printer
Communications Hardware

1. Patron Registration
2. Circulation Services
3. Subscription Maintenance

Bowling Center

1 Workstation
1 Dot Matrix Printer

1. Inventory

Tickets and Tours

1 Workstation
1 Dot Matrix Printer

1. Accounting & Reporting

Maintenance

1 Workstation
1 Dot Matrix Printer
Communications Hardware

1. Inventory
2. Receiving Maintenance Schedule
3. Work Request Log

STAFF CIVIL ENGINEER

2 Workstations 1 Letter Quality Printer 1 Dot Matrix Printer Communications Hardware	1. Project Planning & Maintenance 2. Maintenance & Repair Schedules 3. Facilities Management 4. Buildings & Key Inventory 5. Accounting 6. Correspondence

STAFF AND SUPPORT

Chaplain

1 Workstation 1 Letter Quality Printer Communications Hardware	1. Newsletters & Bulletins 2. Rosters 3. Accounting Records 4. Schedules

Equal Employment Opportunity Office

1 Workstation 1 Letter Quality Printer Communications Hardware	1. Rosters 2. Schedules 3. Case File Index

Family Service Center

2 Workstations 1 Letter Quality Printer 1 Dot Matrix Printer	1. Program Proposals 2. Referral Lists 3. Case File Index 4. Appointment & Schedules

Counseling and Assistance

1 Workstation 1 Letter Quality Printer Communications Hardware	1. Client Status Report & Evaluations 2. Correspondence Control 3. Group Letters

Legal

1 Workstation 1 Dot Matrix Printer Communications Hardware	1. Tickler/Flagging System 2. Budget Tracking 3. Log System

SUPPLY

2 Workstations (Closed System)
5 Workstations (General)
2 Letter Quality Printers
2 Dot Matrix Printers
Communications Hardware

1. Inventory Control & Ordering
2. Purchase Orders & Invoices
3. Accounting Reports
4. Menu Plans & Ordering
5. Correspondence

TRANSIENT PERSONNEL

2 Workstations
1 Letter Quality Printer
1 Dot Matrix Printer

1. Personnel Records
2. Inventories
3. Accounting
4. Violations & Police Reports
5. Correspondence

LIST OF REFERENCES

1. Diebold, J., Managing Information, The Challenge and the Opportunity. Amacom, 1985.

2. Meltzer, M. F., Information: The Ultimate Management Resource. Amacom, 1981.

3. Synnott, W. R., and Gruber, W. H., Information Resource Management. Wiley-Interscience, 1981.

4. Drucker, P. F., Management: Tasks, Responsibilities, Practices. Harper & Row, 1974.

5. BASIS Newsletter, Naval Regional Data Automation Command (NARDAC), September 1985, San Diego, California.

6. BASIS Newsletter, Naval Regional Data Automation Command (NARDAC), November 1984, San Diego, California.

7. Barcomb, D., Office Automation. Digital Press, 1981.

8. Pressman, R. S., Software Engineering: A Practitioner's Approach. McGraw-Hill, 1982.

9. Worley, D. L., and Cronauer, H. T., Information Resource Management for Naval Shore Activities: Concepts and Implementation Strategy, Master's Thesis, Naval Postgraduate School, Monterey, California, September 1984.

10. Hussain, D., and Hussain, K. M., Information Resource Management. Richard D. IRwin, Inc., 1984.

11. O'Brien, J. A., Computers in Business Management. Richard D. Irwin, Inc., 1985.

12. Fulmer, R. M., Supervision: Principles of Professional Management. Glencoe Publishing Co., 1976.

13. Beckhard, R., and Harris, R. T., Organizational Transitions: Managing Complex Change. Addison-Wesley, 1977.

BIBLIOGRAPHY

Boore, W. F., Murphy, J. R., The Computer Sampler, McGraw-Hill Book Co., 1968.

Chruden, H. J., Sherman, A. W., Personnel Management, South Western Publishing Co., 1968.

Enger, N. L., Management Standards for Developing Information Systems, Amacom, 1976.

Foy, F., Computer Management, Auerbach Publishers Inc., 1972.

Frank, M. R., The Effective EDP Manager, Amacom, 1980.

Gremillion, L. L., Managing MIS Implementation, UMI Research Press, 1982.

Luhrman, S. A., A Methodology for Naval Bases and Stations Requirements Analysis: The Case of NAS Moffett Field, M. S. Thesis, Naval Postgraduate School, Monterey, California, 1985.

Martino, R. L., Information Management, MDI Publications, 1968.

Mumford, E., Pettigrew, A., Implementing Strategic Decisions, Longman, 1975.

Quick, T. L., Person to Person Managing, St. Martin's Press, 1977.

Rullo, T. A., Advances in Data Processing Management, Heyden, 1980.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, Virginia 22304-6145	2
2.	Library, Code 0142 Naval Postgraduate School Monterey, California 93943-5002	2
3.	Commander Naval Data Automation Command Navy Yard Washington, D.C. 20374	1
4.	Professor C. R. Jones, Code 54Js Department of Administrative Sciences Naval Postgraduate School Monterey, California 93940-5000	2
5.	Professor R. T. Harris, Code 54He Department of Administrative Sciences Naval Postgraduate School Monterey, California 93940-5000	2
6.	LT G. L. Stampler Surface Warfare Officers School Department Head Course Newport, Rhode Island 02840	1
7.	Computer Technology Programs Code 37 Naval Postgraduate School Monterey, California 93943-5000	1